

# **New RTCM Standard on Real Time GNSS Data Dissemination over the Internet**

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**21.09.2004**

# The Past

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- ◆ **Streaming Differential GPS corrections over Internet and cellular phone networks is feasible**
- ◆ **No significant lack of performance compared to usage of other transportation media**

## **Open issues:**

- **Security**
- **User Accounting and Logging**
- **Session handling**
- **Workload on the server by multiple users**

## ➤ **Generating a Standard**

# **The Future: RTCM - SC104 & Ntrip**

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- ◆ **Working since Jan 2003 on Internet based GNSS data dissemination standard**
- ◆ **WG „Internet Protocol“  
Robert Snow (Thales) / Georg Weber (BKG)**
- ◆ **RTCM now voted for “Ntrip, Version 1.0”**

# Ntrip

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## **N**etworked **T**ransport of **R**TCM via **I**nternet **P**rotocol

- ◆ Based on internet radio technology
- ◆ Open documentation
- ◆ Http compatible
- ◆ Using one port for all data streams
- ◆ Http port 80 supported by Firewalls and Proxy server
- ◆ Usable for various kinds of GNSS data  
e.g. RTCM / CMR / RAW

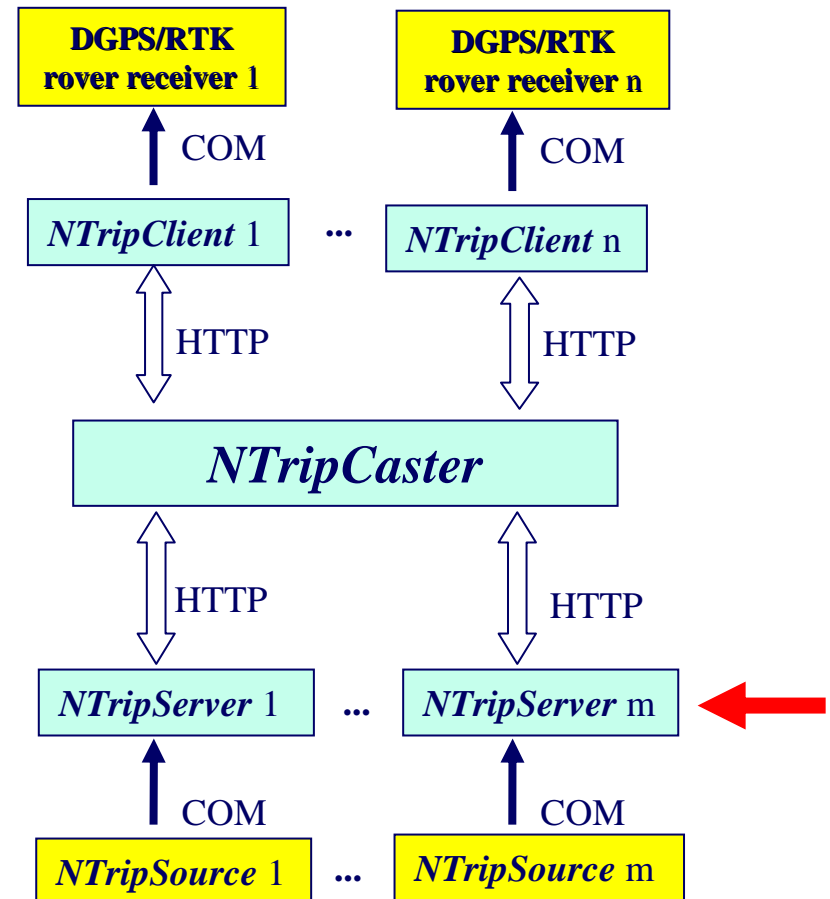
# Ntrip Motivaiton

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- ◆ **Real-time GIS needs wireless Internet access anyway**
  - **Users request real-time GNSS data over the same communication channel**
  - **Getting rid of an extra GPS radio**
- ◆ **Lots of resources in place, e.g. CORS/PBO & Postprocessing: Why deliver a daily newspaper monthly?**

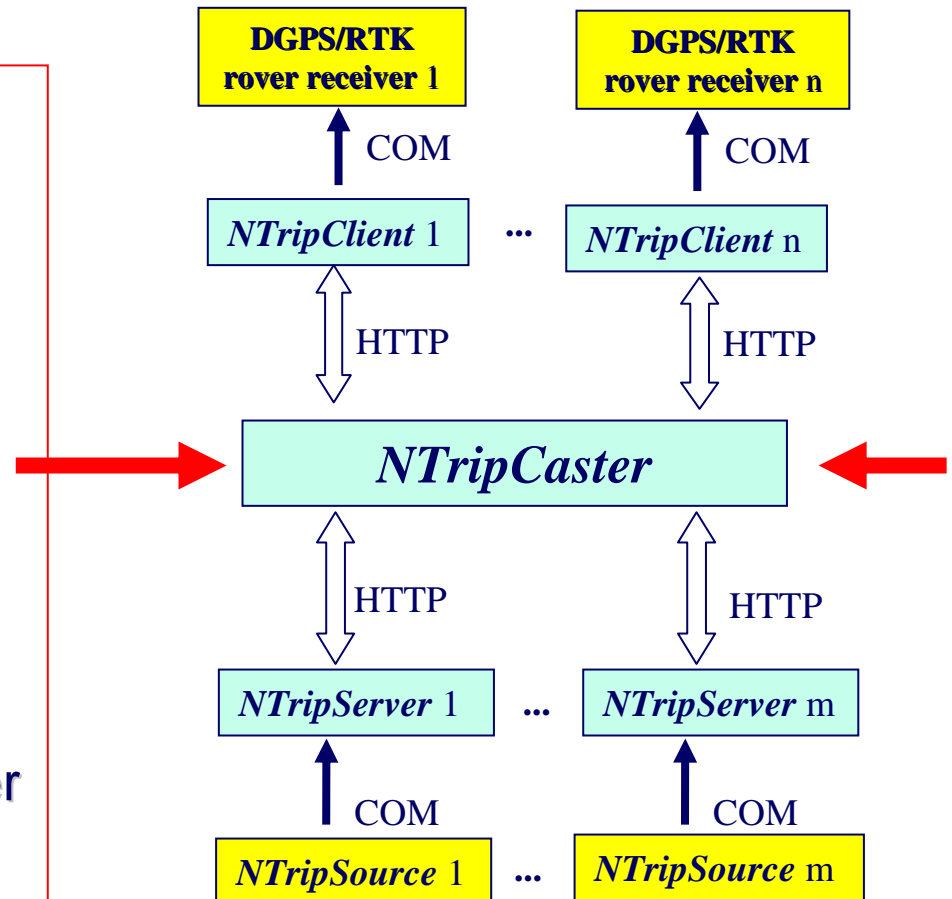
# Ntrip Server

- ◆ NtripServer receives data of NtripSource and forwards it to NtripCaster
- ◆ Mountpoint and password are defined by administrator of NtripCaster for purpose of authentication
- ◆ You can send any data format.



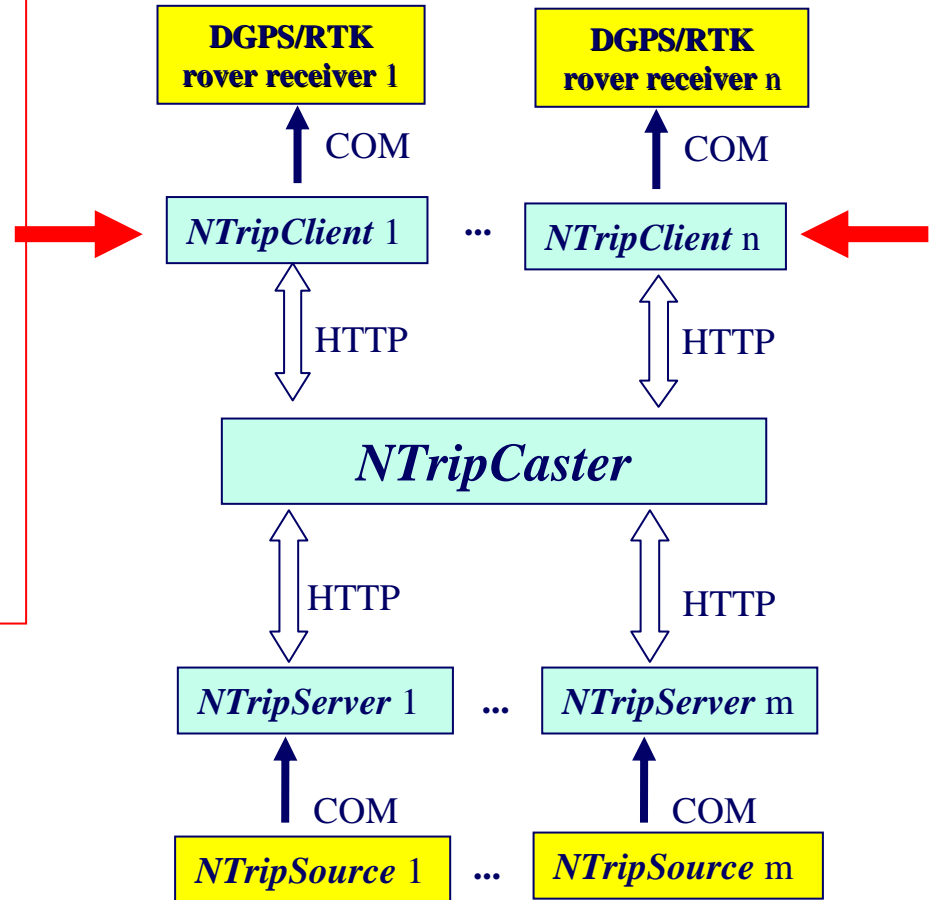
# Ntrip Caster

- ◆ Is the component for stream splitting and broadcasting
- ◆ Acts as "switch board" for connecting NtripClients to required streams
- ◆ Each data stream is listed in a "Source Table"
- ◆ Provider for additional information on other Caster and the Network providers



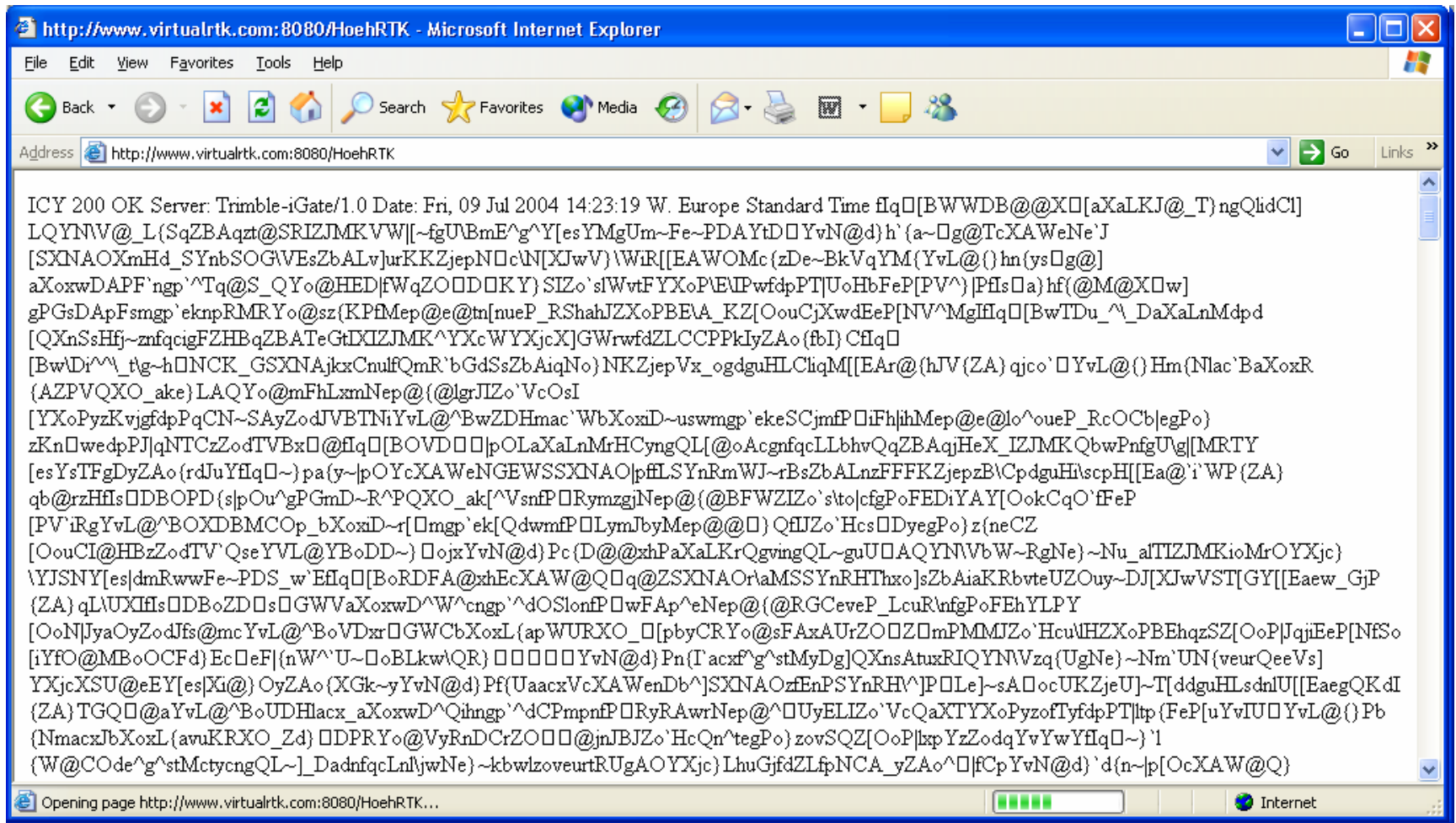
# Ntrip Client

- ◆ Sends and receives data to and from NtripCaster.
- ◆ May retrieve list of available NtripSources and allow selection of source stream
- ◆ Forwards data either to rover RTK GPS receiver or to processing software in an application terminal for calculating position





# Using Http



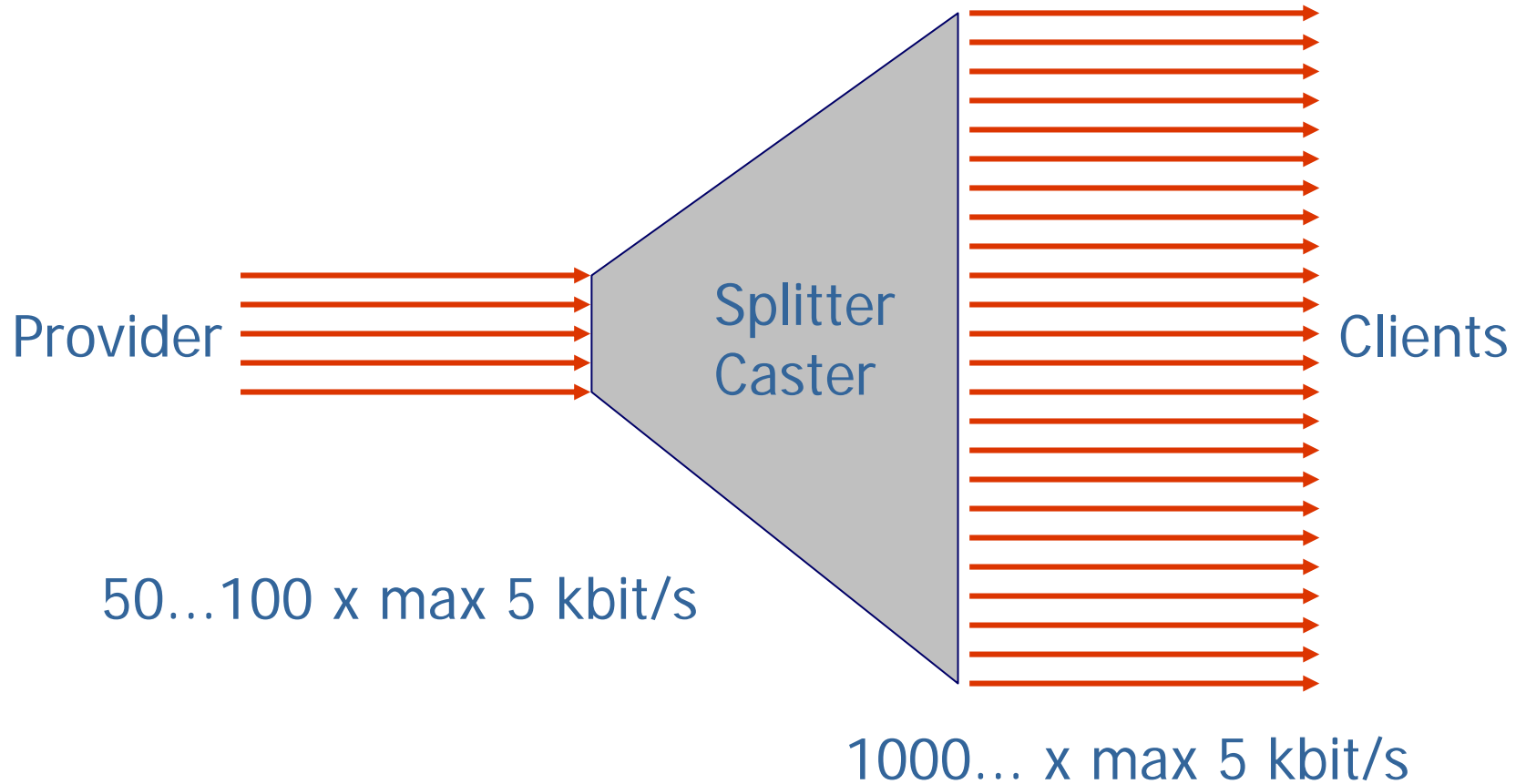
# Ntrip Facts

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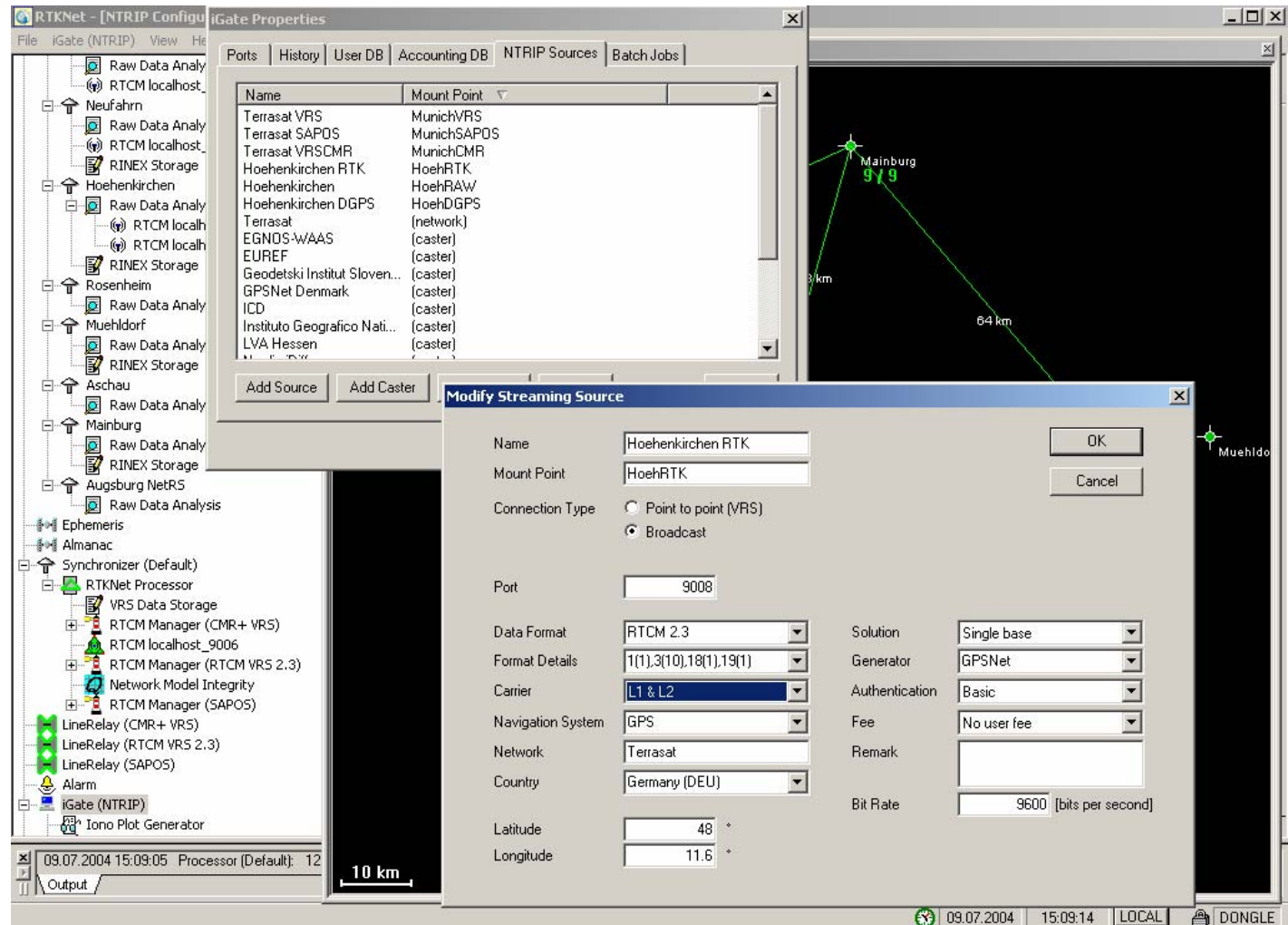
- ◆ **End of dedicated hardware for receiving RTCM**
- ◆ **Major parts of the BKG implementation is available under „GNU General Public Licence“**
- ◆ **No GSM, no access server required**
- ◆ **Internal usage in support of networking DGPS/RTK infrastructure**
- ◆ **Supporting all future wireless Internet transport media like GPRS, UMTS or WLAN**

# Ntrip broadcast

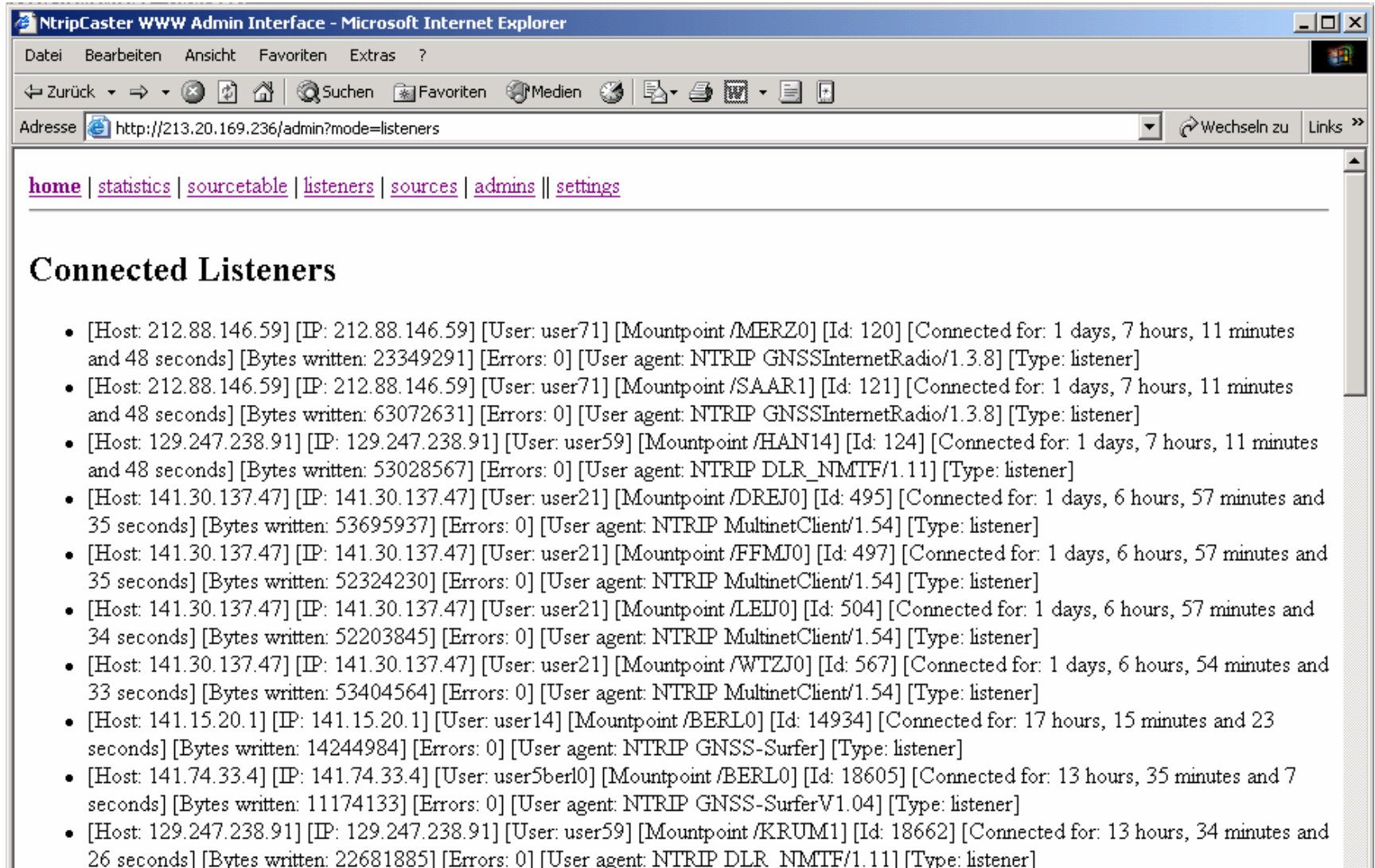
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# Caster implementations: Trimble, Geo++, BKG



# Caster implementation: Here BKG



NtripCaster WWW Admin Interface - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Favoriten Extras ?

Zurück Suchen Favoriten Medien

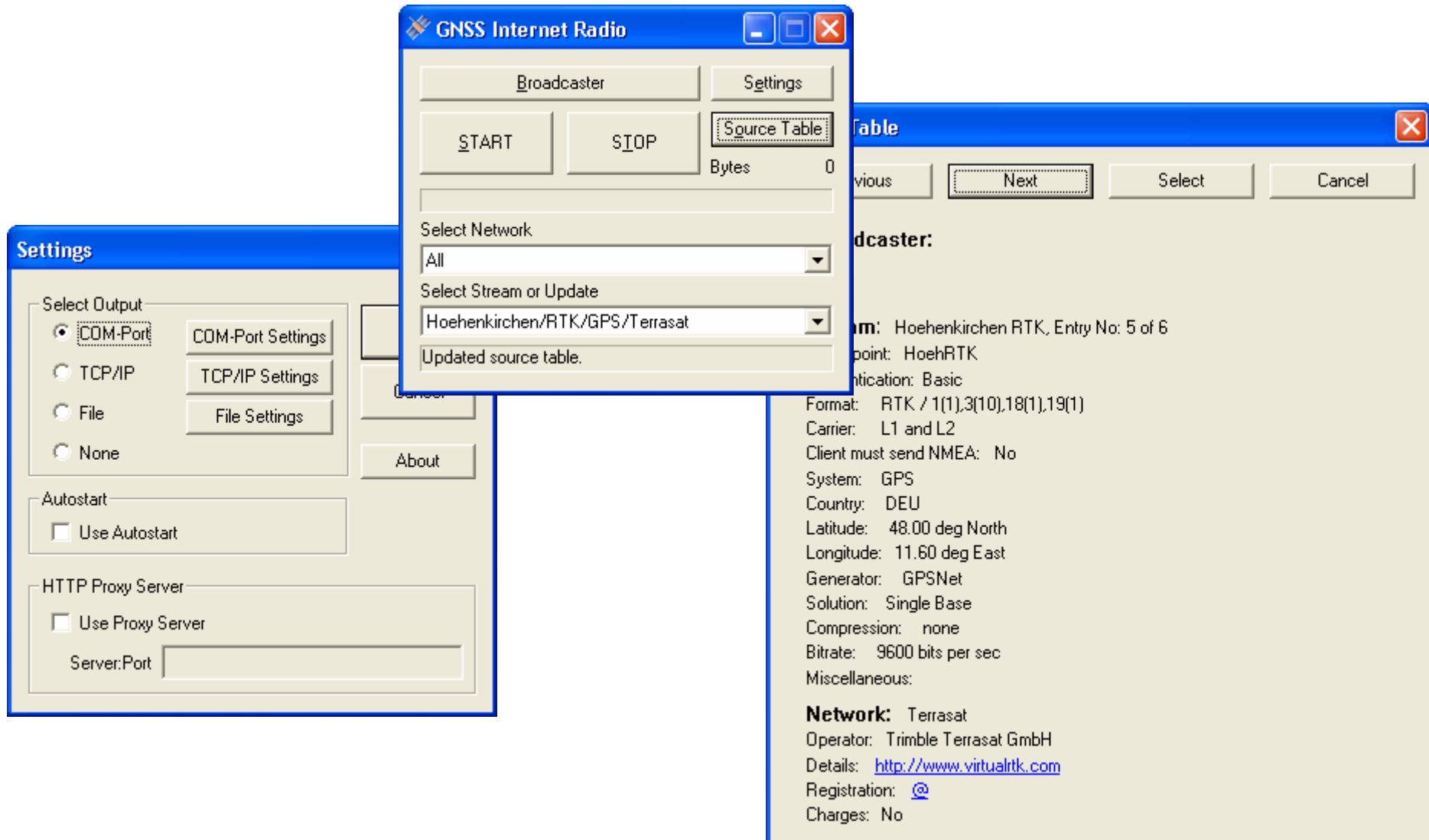
Adresse <http://213.20.169.236/admin?mode=listeners> Wechseln zu Links »

[home](#) | [statistics](#) | [sourcetable](#) | [listeners](#) | [sources](#) | [admins](#) || [settings](#)

## Connected Listeners

- [Host: 212.88.146.59] [IP: 212.88.146.59] [User: user71] [Mountpoint /MERZ0] [Id: 120] [Connected for: 1 days, 7 hours, 11 minutes and 48 seconds] [Bytes written: 23349291] [Errors: 0] [User agent: NTRIP GNSSInternetRadio/1.3.8] [Type: listener]
- [Host: 212.88.146.59] [IP: 212.88.146.59] [User: user71] [Mountpoint /SAAR1] [Id: 121] [Connected for: 1 days, 7 hours, 11 minutes and 48 seconds] [Bytes written: 63072631] [Errors: 0] [User agent: NTRIP GNSSInternetRadio/1.3.8] [Type: listener]
- [Host: 129.247.238.91] [IP: 129.247.238.91] [User: user59] [Mountpoint /HAN14] [Id: 124] [Connected for: 1 days, 7 hours, 11 minutes and 48 seconds] [Bytes written: 53028567] [Errors: 0] [User agent: NTRIP DLR\_NMTF/1.11] [Type: listener]
- [Host: 141.30.137.47] [IP: 141.30.137.47] [User: user21] [Mountpoint /DREJ0] [Id: 495] [Connected for: 1 days, 6 hours, 57 minutes and 35 seconds] [Bytes written: 53695937] [Errors: 0] [User agent: NTRIP MultinetClient/1.54] [Type: listener]
- [Host: 141.30.137.47] [IP: 141.30.137.47] [User: user21] [Mountpoint /FFMJ0] [Id: 497] [Connected for: 1 days, 6 hours, 57 minutes and 35 seconds] [Bytes written: 52324230] [Errors: 0] [User agent: NTRIP MultinetClient/1.54] [Type: listener]
- [Host: 141.30.137.47] [IP: 141.30.137.47] [User: user21] [Mountpoint /LEIJ0] [Id: 504] [Connected for: 1 days, 6 hours, 57 minutes and 34 seconds] [Bytes written: 52203845] [Errors: 0] [User agent: NTRIP MultinetClient/1.54] [Type: listener]
- [Host: 141.30.137.47] [IP: 141.30.137.47] [User: user21] [Mountpoint /WTZJ0] [Id: 567] [Connected for: 1 days, 6 hours, 54 minutes and 33 seconds] [Bytes written: 53404564] [Errors: 0] [User agent: NTRIP MultinetClient/1.54] [Type: listener]
- [Host: 141.15.20.1] [IP: 141.15.20.1] [User: user14] [Mountpoint /BERL0] [Id: 14934] [Connected for: 17 hours, 15 minutes and 23 seconds] [Bytes written: 14244984] [Errors: 0] [User agent: NTRIP GNSS-Surfer] [Type: listener]
- [Host: 141.74.33.4] [IP: 141.74.33.4] [User: user5berl0] [Mountpoint /BERL0] [Id: 18605] [Connected for: 13 hours, 35 minutes and 7 seconds] [Bytes written: 11174133] [Errors: 0] [User agent: NTRIP GNSS-SurferV1.04] [Type: listener]
- [Host: 129.247.238.91] [IP: 129.247.238.91] [User: user59] [Mountpoint /KRUM1] [Id: 18662] [Connected for: 13 hours, 34 minutes and 26 seconds] [Bytes written: 22681885] [Errors: 0] [User agent: NTRIP DLR\_NMTF/1.11] [Type: listener]

# EUREF-IP Client





# IDB-Symbeni 1.0

IDB-Sym 1.0 (acronimo di IDB © Internet Differential Broadcast - Symbian ©) permette di integrare le potenzialità dell'ultima generazione di telefoni cellulari GPRS dotati del sistema operativo Symbian 60 Series e la rete di stazioni permanenti GPS - VRS - NTRIP di Galileo Sistemi S.r.l.

La configurazione ottimale di questa soluzione prevede l'utilizzo di un telefono cellulare Nokia 7650, una connessione serial adapter Bluetooth ©, un contratto GPRS con un gestore di telefonia mobile nazionale e un abbonamento\* al servizio di correzione differenziale RTCM standard, attraverso Internet IDB-DGPS e IDB-RTK erogati da Galileo Sistemi.

La connessione tra il GPS\*\* e il telefono avviene mediante un dispositivo Bluetooth © predisposto e compatibile con tutte le marche di GPS presenti sul mercato. Palmare ed Internet avviene attraverso la connessione senza fili Bluetooth © ed un normale accesso ad Internet.



L'accesso ai dati differenziali offre la possibilità di ottenere correzioni di codice, per applicazioni di tipo GIS, e codice e fase per applicazioni RTK (Real Time Kinematic) in tempo reale. I due servizi IDB-DGPS e IDB-RTK sono disponibili in diverse aree del territorio nazionale e sono fruibili mediante la sottoscrizione di abbonamenti annuali, semestrali e trimestrali. La connessione GPRS offre il vantaggio di "pagare" unicamente la quantità di dati trasmessi e ricevuti abbassando notevolmente i costi di esercizio dell'utente.

La scelta della stazione avviene, molto semplicemente, selezionando la stazione desiderata ed, ovviamente, più vicina rispetto alla posizione dell'utente. L'interfaccia utente indica lo stato di autenticazione al servizio IDB-DGPS o IDB-RTK. La stazione selezionata, il device Bluetooth © utilizzato, i Byte ricevuti ed inviati.

Il software IDB-SYM 1.0 può essere acquistato in versione bundle che con il software di controllo GPS che permette di configurare e gestire i parametri funzionali ed operativi dello strumento che comprende:

- IDB-SYM 1.0;
- Abbonamento annuale IDB-DGPS o IDB-RTK;
- Telefono GPRS Nokia 7650;
- Serial Adapter Bluetooth ©.

Il Serial Adapter Bluetooth © è compatibile con tutti i ricevitori GPS e non necessita di configurazioni particolari.

L'alimentazione del Serial Adapter è garantita da una batteria interna ricaricabile: è possibile richiedere una versione che viene alimentata dalla batteria del GPS.

L'autonomia della versione con la batteria integrata è di circa 4 ore.



L'utilizzo dell'applicativo è molto semplice.

L'autenticazione permette di accedere ai servizi di correzione differenziale di Galileo Sistemi; dopo l'autenticazione verrà richiesto il tipo di connessione alla rete mobile che si desidera utilizzare; Successivamente viene eseguita la connessione all'apparato Bluetooth in dotazione ed infine, richiesta la stazione dalla quale ricevere la correzione differenziale.

Le opzioni Start e Stop permettono l'attivazione e la pausa della ricezione della correzione differenziale attraverso Internet consentendo l'ottimizzazione dei costi di gestione.

Galileo Sistemi S.r.l.  
Via Viviani, 10  
20124 - Milano  
Italy

(39) 02.66.70.41

(39) 02.66.704.282

info@galleosistemi.com



## IDB-Sym 1.0

IDB-Sym 1.0 è un modulo applicativo per telefoni cellulari con sistema operativo Symbian® series 60 che consente la ricezione della correzione differenziale standard RTCM mediante una connessione internet GPRS/UMTS.

Tutti i nomi dei prodotti e i marchi qui menzionati sono proprietà delle rispettive società.

Galileo Sistemi S.r.l.  
Via Viviani, 10  
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(39) 02.66.70.41

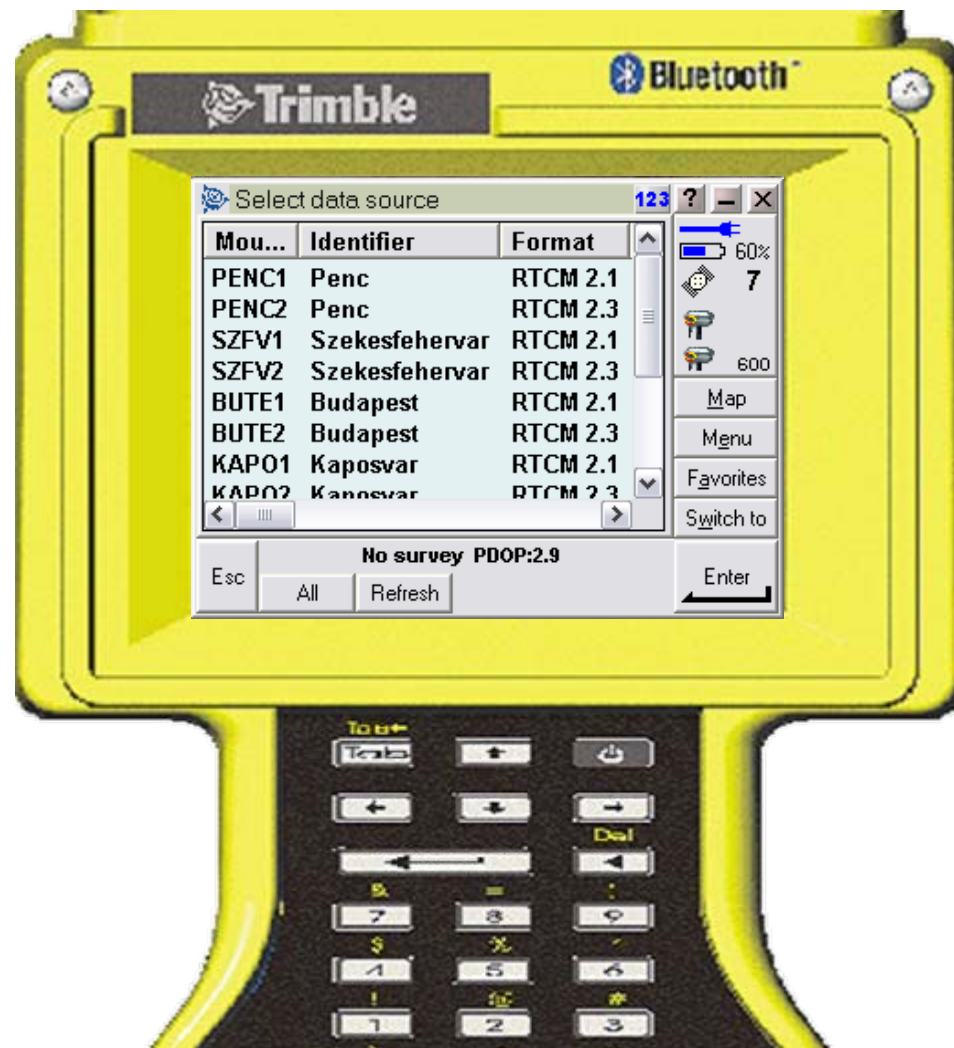
(39) 02.66.70.42.82

info@galleosistemi.com



# Trimble Client

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# Commercial Hard and Software

## Supporting NTRIP

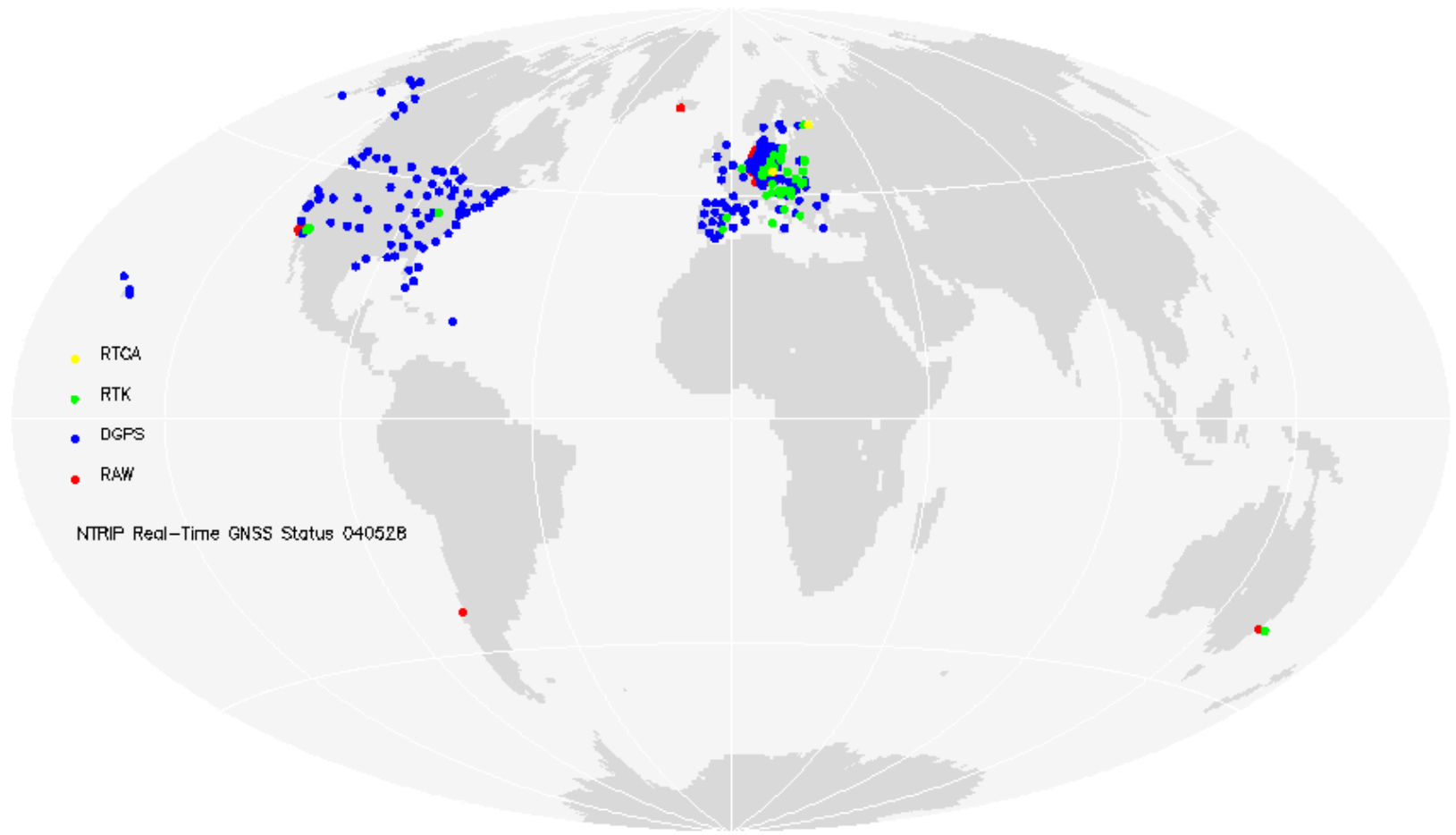
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ArcNtrip ArcPad GIS Data Collection Software, NtripClient  
EuroNet DGPS Network Processing Software, NtripClient&Server  
EuroRef Reference Station Software, NtripClient  
GART-2000 Rover Control & GIS Data Collection Software, NtripClient  
GNCASTER Ntrip Broadcaster Software, NtripCaster  
GNSMART DGPS & RTK Networking Software, NtripClient&Server  
GPSBase Reference Station Software, NtripServer  
GPSNet DGPS & RTK Networking Software, NtripCaster  
PocketGPSLib MS Visual C# .NET GpsLibrary for PocketPC, NtripClient  
SurveyController Rover Control Software, NtripClient  
TerraSync GIS Data Collection & Data Maintenance SW, NtripClient

Status Sept 2004

# Ntrip Status: Streams, Worldwide

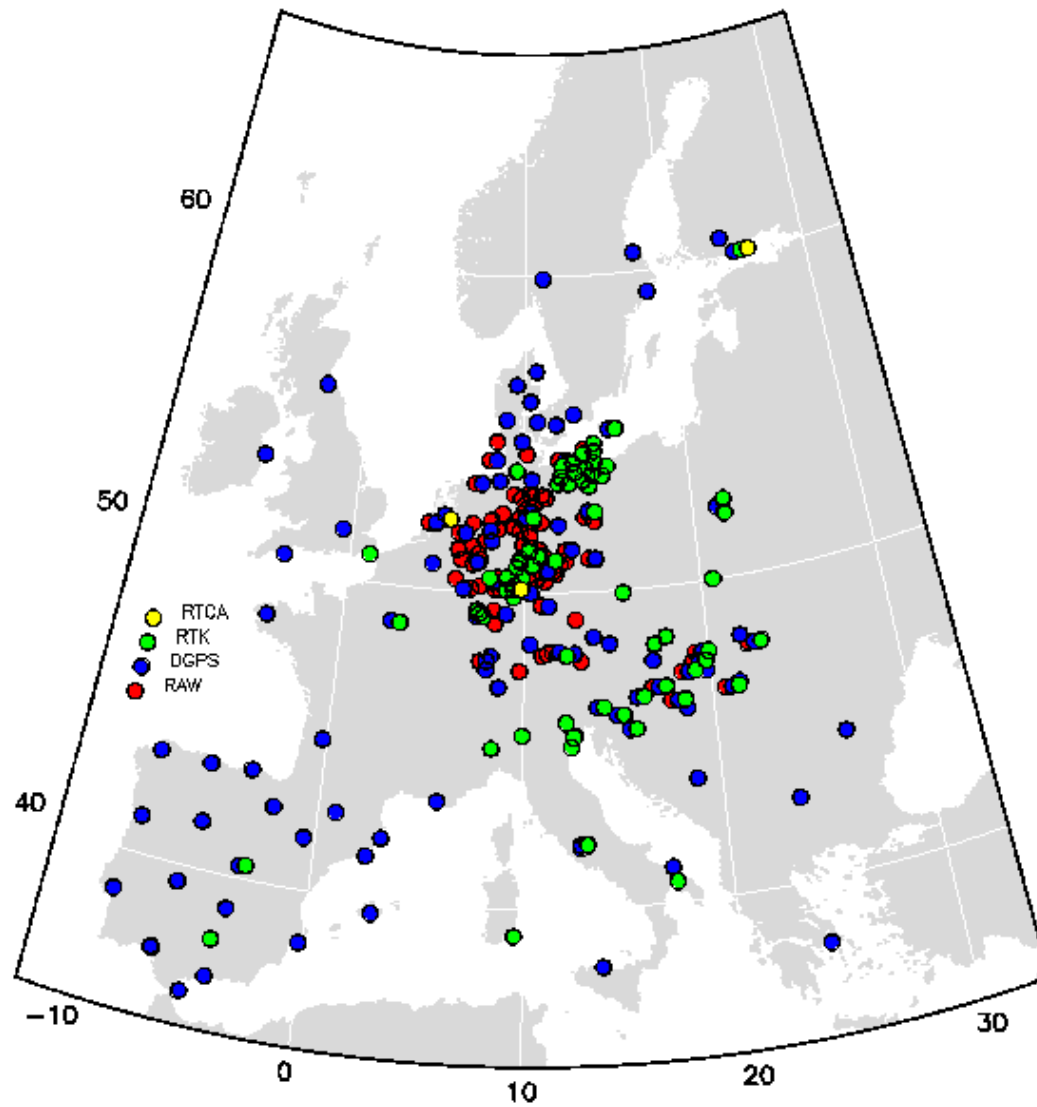
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# Ntrip Status: Streams, Europe

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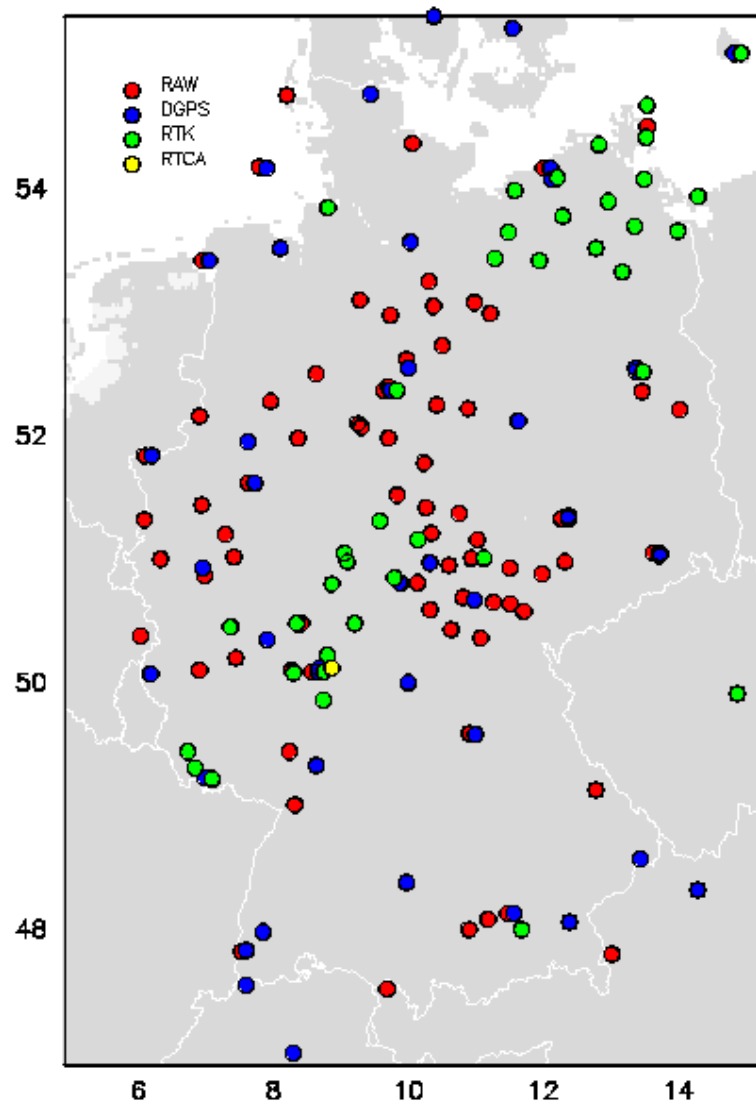
Ntrip Real-Time GNSS Networks All-Europe, Status 040916



# Ntrip Status: Streams, Germany

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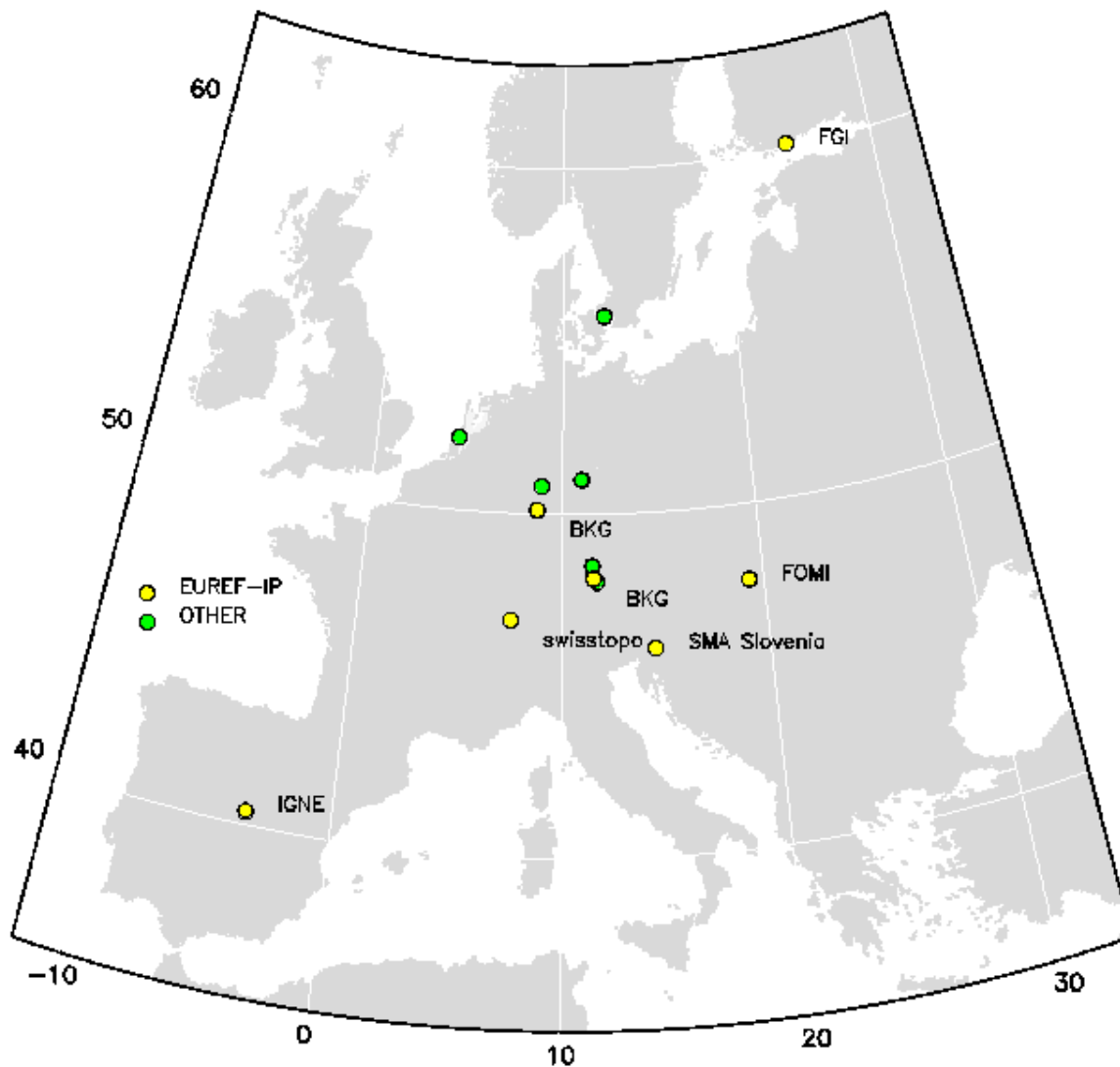
Ntrip Real-Time GNSS Network All-Germany, Status 040916



# Ntrip Status: Provider, Europe

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Ntrip Real-Time GNSS Network NtripCaster-Europe, Status 040916



# Summary

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- ◆ **Streaming Differential GPS corrections over Internet and cellular phone networks has proofed working**
- ◆ **RTCM committee accepted Ntrip as standard for packet based communication**
- ◆ **Various Ntrip clients are available and easy to develop.**
- ◆ **Multiple services already established**
- ◆ **Commercial SW available and under developement**

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**Questions ?**

**[http://igs.ifag.de/index\\_ntrip.htm](http://igs.ifag.de/index_ntrip.htm)**